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David M. Pepper

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DONALD F. MOFFORD, ESQ.  
DALY, CROWLEY & MOFFORD, LLP  
275 TURNPIKE STREET, SUITE 101  
CANTON, MA 02021-2310

EXAMINER

SOUW, BERNARD E

ART UNIT

PAPER NUMBER

2881

DATE MAILED: 03/26/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/837,733

Applicant(s)

PEPPER ET AL.

Examiner

Bernard E Souw

Art Unit

2881

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 25 August 2003.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-30 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☒ The proposed drawing correction filed on 25 August 2003 is: a) ☒ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Last Office Action Withdrawn***

1. The previous Office Action dated 11/10/2003 is withdrawn in view of this revised action. Except for the addition of this first section and the inclusion of a requested article in the PTO-892, nothing else has been changed from the previous Office Action. Unchanged is also the finality of the claim rejections, which is confirmed in this revised Office Action (see section 14).

### ***Amendment***

2. The Amendment dated 08/25/2003 in response to the first Office Action dated 05/15/2003 has been entered. The present Office Action is made with all the suggested amendments being fully considered.

Claims 1, 9, 12-17, 19, 21 and 25-30 have been amended, which include independent claims 1, 19 and 30.

Accordingly, claims 21-23 remain pending in this Office Action.

### ***Drawings Amendment***

3. The drawings amendment of numeral 60 in Fig.1, proposed along with the Amendment dated 05/15/2003, is approved by the Examiner. Consequently, the previous objection of the disclosure is now removed.

***Examiner's Preliminary Remarks***

4. A comprehensive response to Applicant's arguments is given at the end of this Office Action. However, careful and thorough reading of Applicant's response has lead to the conclusion that Applicant does not argue the rejection of the dependent claims, but solely insists on the patentability of the independent claims, i.e., claims 1, 19 and 30, which have been also amended by Applicant. Therefore, the claim rejections presented in this Office Action are particularly addressed to the independent claims, while leaving the rejection of dependent claims practically unchanged.

The present Office Action recites practically the same ground(s) of rejection(s), as already brought up in the previous one, except for some additional prior arts that are necessitated by Applicant's amendment of the claim(s), or introduced in support of the Official Notices previously made in the first office Action on page 6, 2<sup>nd</sup> full paragraph, and on page 7, 1<sup>st</sup> full paragraph. In some cases the primary and secondary references have been exchanged regarding their roles to better address Applicant's arguments. Such changes and additions of new prior arts are legitimate, not only to provide a stronger and more accurate response to Applicant's arguments, but in the first place because Applicant has amended the claims, especially all the independent claims.

Consequently, those changes do not prevent the present Office Action from being finalized.

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arimoto et al. (SPIE Proceedings Vol. 2990, Free Space Laser Communications Technologies IX, San Jose, CA, February 1997).

Arimoto et al. disclose a system for focusing electromagnetic energy on a target comprising:

(a) first means, i.e., the transmitter part of a laser transceiver at the bottom of Fig.4, for providing a pilot beam of electromagnetic energy that is reflected by, and emitted to the right hand side of, the deformable mirror (BIM-13);

(b) second means for receiving a spatially and temporally dependent electromagnetic field having phase, frequency, amplitude, and polarization characteristics corresponding to the various modulation techniques used in optical communications, as shown in Fig.4 beginning from the right of and reflected by the deformable mirror (BM-13), then reflected to the left by a beam splitter, to finally end-up at the input of a fiber-coupler, also shown in Fig.4;

(c) third means, i.e., beginning with the fiber coupler over a low noise fiber amplifier and ending with the receiver part of the transceiver system shown in Fig.4, for analyzing the received electromagnetic field from the target to determine, from the received electromagnetic field, information that is indicative of the nature of the target, the purpose of the target, the functionality of the target, and the operational state of the target, and in response to the information, for providing data which is indicative of the nature of the target, the purpose of the target, the functionality of the target, and the operational state of the target; and

(d) fourth means, i.e., a transceiver, for receiving the data from the third means (fiber coupler & low noise amplifier) and, in response to the data, for providing a modulated output beam originating from the transmitter part of the same transceiver, and wherein the fourth means (transceiver) is adapted to modulate the output beam from the laser transmitter part of the transceiver by changing at least one of a phase characteristic and a carrier wavelength characteristic (corresponding to a phase-modulated and a frequency-modulated communication signal, respectively), and wherein the modulated output beam is predistorted by the deformable mirror (BIM-13) based on the information given by a wave front detector or sensor (WFS) shown at the top row of Arimoto's Fig.4 to compensate for distortions, phase noise and amplitude noise in said received electromagnetic field, as easily understood by one of ordinary skill in the art.

Arimoto's input signal does not necessarily correspond to a reflection of the pilot beam from the target. However, it may as well be used as such by one of ordinary skill in the art. There is nothing in Arimoto's, neither in the general knowledge in the art, that

would prevent such an application of Arimoto's device. The possibility that Arimoto et al. may well have used their apparatus for a different purpose does not alter the conclusion that Applicant's use of a prior art device (i.e., Arimoto's) would be prima facie obvious from the purpose disclosed in the reference. *In re Lintner*, 173 USPQ 560.

Furthermore, the court has held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. If the prior art apparatus (in this case Arimoto's) is able to perform the process as claimed (i.e., Applicant's countermeasure), then it meets the claim. *Ex parte Masham*, 2 USPQ2d 1647 (1987).

► Arimoto's system can be very well designed for the purpose of countermeasure, either to confuse or even to destroy the target. However, such limitations are presently not recited in Applicant's claim(s). In this regard, Arimoto's device is completely sufficient to meet Applicant's independent claims 1 and 30 as they presently stand.

However, in anticipation of a possible renewed amendment of the claim(s) that would inevitably lead to an endless process of examination, the Applicant is here reminded of a remark already made by the Examiner in the first Office Action, page 6, 2<sup>nd</sup> full paragraph:

*"The Examiner takes the Official Notice that all the adaptive optics (AO) features described in the various embodiments of the disclosure, but not necessarily recited in the claims, are well known in the art. A **specific** prior art **will be given** only **after** more specific AO features have been incorporated by Applicant into the claims, i.e., after the*

*claims have been narrowed down. For these reasons, any later identification of prior art given by the Examiner should not be interpreted as new ground(s) of rejection."*

In view of that remark, the fact that Arimoto's input beam also goes through the same deformable mirror that is later also used for the output beam, does not contradict claims, because such limitation is not recited in the claims. Furthermore, Arimoto as ground of rejection can be easily modified by Komine's (USPAT 6,219,360), showing in Fig.5 at bottom right an input beam that directly goes into the array (=Arimoto's WFS) without going through the AO element(s) shown in upper left, the latter only affect(s) the output beam(s). In this regard, Komine's output beam (upper right) goes back into the same optics as the input beam, but in the reverse direction, just as originally depicted by Arimoto et al.. This new combination (Arimoto + Komine) is much more convincing rejection than the previous one (Wang + Anafi) brought up in the first Office Action, although Wang can still be retained as a third prior art to further modify (Arimoto + Komine) for rejecting claim 2 with regard to the use of a beacon and a glint from the target.

► Claim 30 recites practically the same limitations as claim 1. Specifically, the first limitation is the same as claim 1(a), the second limitation is the same as claim 1(b), the third limitation is the same as claim 1(c) and the fourth limitation is the same as claim 1(d). Therefore, claim 30 is rejected by the same reason over the same prior arts as claim 1.



7. Claims 4, 8 and 13-17 are also rejected under 35 U.S.C. 103(a) as being unpatentable over Arimoto et al.

► Regarding claim 4, Arimoto's system comprises a telescope recited on the upper right corner of Fig.4.

► Regarding claim 8, the recitation of a wave front error sensor is rendered obvious by Arimoto et al. as shown in the box on the upper left corner of Fig.4.

► Claims 13-17 recite limitations that are inherent in Arimoto's as generally understood by one of ordinary skill in the art:

- Arimoto's modulated output beam, i.e., as a communication means, is inherently adapted to affect the target in a predetermined manner, i.e., to deliver a message. A modification of this purpose, including for countermeasure, is well known in the art. In this regard, the Applicant is again reminded of the remark from the first Office Action, already recited above, i.e., *the Examiner takes the Official Notice that all the features described in the various embodiments of Applicant's disclosure, but not necessarily recited in the claims, are well known in the art. A specific prior art will be given only after more specific features have been incorporated by Applicant into the claims, i.e., after the claims have been narrowed down.*

- As generally known in the art, Arimoto's fourth means, i.e., the transceiver part, inherently includes conventional means for detecting a modulation of the beam received from the target, a closed-loop system controller, and an electro-optic shutter including means for controlling the deformable mirror, the latter shown separately by the box on the upper left of Arimoto's Fig.4.

8. Claims 2, 3 and 5-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arimoto et al. in view of Livingston (USPAT # 5,973,309) and Stappaerts (USPAT # 5,378,888).

Arimoto et al. as understood by one of ordinary skill in the art show all the limitations of claims 2, 3 and 5-7, as previously applied to the parent claim 1, except for specific limitations that are to be addressed individually, as follows:

► Regarding claims 2 and 3, the limitation of a beacon laser that is mounted off-axis is rendered obvious by Livingston, as shown in Fig.1 by tracking system 10 which emits a beacon or pilot beam T off-axis with respect to the main (tracking) device 16. Alternatively, as shown in Fig.3 Stappaerts also directs a beacon laser beam 37, which is divergent, and off-axis to the axis of the receiver's optic 40, as recited in Col.1/ll.60-68 and Col.2/line 1.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a beacon that is mounted off-axis as taught by Livingston and/or Stappaerts, thereby using a glint emitted from the target surface either under a scanned beacon beam, as taught by Livingston in Col.3/ll.4-10 & col.4/ll.22-340 & 35-45, or a divergent beacon laser beam as taught by Stappaerts in Col.1/ll.60-68 & Col.2/line 1, since an off-axis and scanned or divergent beacon has a (much) wider angle of view that makes the target acquisition (much) easier.

► Regarding claim 5, the recitation that the telescope as used by Arimoto et al. is gimbaled is well known in the art, as rendered obvious by Livingston, showing in Fig.1 a

beacon laser 14 and a tracking receiver 16 on a gimbal mount 18, as recited in Col.3/ll.52-55.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to put the beacon laser and/or the tracking receiver's optics on a gimbal mount, since a gimbal mount provides the best flexibility and maneuverability in a telescope's pointing direction.

► Regarding claim 6, Livingston's target tracking system 16 comprises a detector 32 in optical alignment with a telescope 28, as shown in Fig.2 and recited in Col.3/ll.47-67 & Col.4/ll.1-45.

► Regarding claim 7, a tracking processor is comprised in Livingston's system, as recited in Col.4/ll.22-67 & Col.5/ll.28, and also by Stappaerts in Col.2/ll.1-10 in numeral 32.

9. Claims 9-11 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arimoto et al. in view of Anafi et al. (USPAT # 4,996,412) and Wang (USPAT # 4,005,935).

Arimoto et al. as understood by one of ordinary skill in the art show all the limitations of claims 9-11 and 18, as previously applied to the parent claims 1 and 8, except for specific limitations that are rendered obvious by Wang and Anafi et al., to be addressed individually as follows:

► Regarding claim 9, the recitation of providing an output beam which is a phase conjugate of the received wave front is rendered obvious by Wang in Col.2/ll.42-53 and also by Anafi et al. in Col.3/ll.12-35.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide an output beam which is a phase conjugate of the received wave front, since such a phase conjugated wave front will exactly cancel out the atmospheric turbulence and result in an output beam that is near diffraction-limited upon the target, as taught by Wang.

► Regarding claim 10, a deformable mirror is shown by the optical element shown on the upper right corner of Arimoto's Fig.4. A deformable mirror is also rendered obvious by Anafi et al., as recited in Col.2/ll.62-65.

► Regarding claim 11, the limitation that the mirror control means for controlling the deformable mirror is responsive to the wave front sensor is understood by one of ordinary skill in the art from the upper row of Arimoto's Fig.4, and is also rendered obvious by Anafi et al., as recited in Col.1/ll.21-24, Col.2/ll.33-36 and Col.3/ll.4-11.

► Regarding claim 18, the use of phase conjugate mirror is rendered obvious by Anafi et al., showing in Fig.1 a phase conjugate mirror 15, as recited in Col.2/ll.16-19.

10. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Arimoto et al. in view of Anafi et al. (USPAT # 4,996,412) and Wang (USPAT # 4,005,935), and further in view of Stappaerts.

Arimoto et al. as understood by one of ordinary skill in the art show all the limitations of claim 12, as previously applied to the parent claims 1 and 12, except for specific limitations a beacon laser different than the laser used to form the output beam.

As described in the Abstract, lines 7-11 from bottom, Stappaerts uses a laser beam for engagement purpose (output beam) that may be different than the laser used for acquisition (beacon) recited in the Abstract, lines 7-9.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a beacon laser that is different than the laser used for the output beam, since a beacon beam is usually more divergent than the output beam, as well known in the art, and also specifically taught by Stappaerts.

11. Claims 19-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arimoto et al. in view of Garfinkle (USPAT 5,592,293).

Claim 19 recites the same limitations as claims 1 and 30, with the addition of a starlight in place of a laser beacon. The use of natural stars or artificial stars in AO systems to replace laser beacons placed at the target or reflected from target surface is well known in the art. This previous Official Notice is rendered obvious by a large number of prior arts, among others by Garfinkle, as recited in Col.4/II.21-34, whereby it is further well known in the art that the use of more than one natural stars are known to substantially increase the AO system's field of view (FOV).

With *Garfinkle's* starlight replacing the beacon in claims 1 and 30, the further limitations of claim 19 are rendered obvious by Arimoto et al.. In particular, the first

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limitation (with the laser beacon replaced by star light) is the same as claim 1(a), the second limitation is the same as claim limitation 1(b) and/or 1(d), in which limitation 1(c) is inherently implicated.

► Regarding claim 20, the recitation of a wave front error sensor is rendered obvious by Arimoto et al. as shown in the box on the upper left corner of Fig.4. This claim recites the same limitations as claim 8, and is therefore rejected by the same token as claim 8, but now with Garfinkle as a secondary prior art because of the dependency on claim 19.

► Regarding claim 21, the recitation that the purpose of the wave front error sensor is to detect distortions induced by the atmosphere is inherent in Arimoto's, as understood by those of ordinary skill in the art.

► Regarding claim 22, the recitation of a deformable mirror is shown by the optical element shown on the upper right corner of Arimoto's Fig.4.

► Regarding claim 23, the limitation that the wave front sensor includes means to predistort the output beam is inherent in Arimoto's, as understood by those of ordinary skill in the art.

► Regarding claim 24, the recitation of a laser illuminating the deformable mirror to provide the output beam is obvious in Arimoto's Fig.4, as understood by those of ordinary skill in the art.

► Claim 25 recites the same limitations as claim 13, and is therefore rejected by the same token, but now with Garfinkle as a secondary prior art because of the dependency on claim 19.

- ▶ Claim 26 recites the same limitations as claim 14, and is therefore rejected by the same token, but now with Garfinkle as a secondary prior art because of the dependency on claim 19.
- ▶ Claim 27 recites the same limitations as claim 15, and is therefore rejected by the same token, but now with Garfinkle as a secondary prior art because of the dependency on claim 19.
- ▶ Claim 28 recites the same limitations as claim 16, and is therefore rejected by the same token, now with Garfinkle as a secondary prior art because of the dependency on claim 19.
- ▶ Claim 29 recites the same limitations as claim 18, and is therefore rejected by the same token, but now with Garfinkle as a secondary prior art because of the dependency on claim 19.

12. Claims 13-17 and 25-28 are additionally rejected under 35 U.S.C. 103(a) as being unpatentable over Arimoto et al. in view of Garfinkle, and further in view of Pepper (USPAT # 4,767,195) and general knowledge in the art.

Arimoto et al. show all the limitations of claims 13-17 and 25-28, as previously applied to the parent claims 12 and 24, except for the limitation of modulating the output beam and other claim limitations to be addressed below.

Modulation of the output beam is desired in case the system is intended for jamming optical communications and confusing the navigational system of the target. As generally known in the art, optical communications to and from space satellites and

navigational systems of ballistic missiles are carried out by modulated optical signals. While Pepper's reference is only one of the many conventional methods of modulating optical communication signals, there is an abundance of optical *phase* as well as *intensity* modulators up to 10 Gbps modulation frequencies available in the commercial market today.

Claims 13-17 and 25-28 recite limitations regarding methods and instrumentation *conventionally* used for implementing these optical modulations. These conventional methods and instrumentations are also well known in the art. This Official Notice taken by the Examiner is here supported by a large number of references and prior arts, as disclosed by Pepper (USPAT 4,767,195), which is just one among many others.

► Specifically regarding claim 25, the limitation of modulating the laser output beam is desired in case the IRCM is intended for jamming optical communications or navigation of a guided missile, as accomplished by the TADIRCM system of the US Navy that began already in 1997 (see downloaded Global Security webpage, listed in PTO-892), successfully flight-tested in August 1999 (see downloaded Sanders News Releases, listed in PTO-892), and completed a final major test in November 2001 (see Global Security webpage and BAE Systems Vol. II, No.18, October 22, 2001, both listed in PTO-892).

► Specifically regarding claims 26-27, the limitation of detecting a modulation in a beam received from the target is well known to one of ordinary skill in the art, since an effective jamming (i.e., using low power not exceeding, or even much below, the jam/signal ratio of the target system) can be easily achieved by modulating the jamming



signal at the same frequency as the frequency used in the communication/navigation of the target system, as disclosed in the second section of the downloaded webpage of Military Review, March-April 2001, page 12, under the title "GPS Signals Jammed During Tank Trials" based on a real incident in 2000 also reported to the public in the same year. Although jamming the GPS guidance is done at some RF frequency, it is known in the art that the same method would equally work in optical frequencies, since both are of the same nature, i.e., electromagnetic waves.

It would have been obvious to one of ordinary skill in the art, that, in order to implement the method described in the Military Review above, the carrier and modulation frequencies of the target system must first be known, i.e., by previously detecting it (claim 26) then transferring it to the laser output beam to do the jamming, preferably in a closed-loop system which conventionally includes a system controller, as recited in claim 27.

► Specifically regarding claim 28, the limitation of modulating by means of an electro-optic shutter disposed in the path of the output laser is conventional in case of intensity modulated optical signal. Such optical modulators are available in the commercial market at least since 1999, as evidenced, just for example, by the downloaded websites of two companies, ERA Technology and Electro-Optical Products Corporation, both listed in PTO-892.

13. (Repeat from the previous Office Action) The many Official Notices recited by the Examiner were made due to the general knowledge in the art, the abundance of

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references and/or prior arts, as well as due to the broadness of Applicant's claim. Consequently, picking up one or two of them in the next Office Action in case the Official Notice is challenged by the Applicant, or in case a claim is narrowed down by the Applicant, will not constitute a new ground for rejection. For example, regarding claim 19 the Official Notice on the use of natural (or artificial) star is supported, e.g., by Potter (USPAT # 5,528,493) as recited in Col.3/ll.22-30, and further, by Chun et al. (Gemini Preprint #60, see PTO-892), as recited in the Abstract line 6.

### ***Final Rejection***

14. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office Action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

***Response to Applicant's Arguments***

15. Applicant's arguments filed 08/25/2003 have been fully considered but they are not persuasive. The following is the Examiner's response to Applicant's arguments.

► Applicant's response does not argue the rejection of the dependent claims, but only insists on the patentability of the independent claims, i.e., claims 1, 19 and 30, which have been also amended by Applicant. While the amendments have necessitated new ground of rejection based on new prior arts, Applicant's arguments against the previous original claims are refuted as follows:

► Applicant's argument on page 11, that *"the Examiner only generally states that Wang could be modified by incorporating the WFS of Anafi, but fails to state which WFS of Anafi should be used or how it should be incorporated into Wang's"*, is not persuasive, because it contradicts Applicant's own statement of a few lines before, reciting *"although the examiner explains in great details the operation of Anafi, ..."*, and it also ignores Examiner's lengthy description on page 5 & 6 of the previous office Action, how to modify Wang's by Anafi's. The answer to Applicant's specific question, *"which WFS of Anafi should be used, or how it should be incorporated into Wang's"* is well known to one of ordinary skill in the art, since Anafi's WFS & deformable mirror system is known as a modern version of Wang's phase-conjugate system based on the Brillouin mirror. Further technical details, as to how to modify Wang's arrangement by Anafi's, thereby rearranging Anafi's optics in case a correction of the laser beam is not necessary, and an imaging capability is not desired, are also well known in the art.

As already explained in great details on pages 5 & 6, parts of Anafi's optics are directed to correct distortions in the laser beam itself, which may be discarded, if it is not considered necessary. Secondly, also described in great details on pages 5 & 6, in Anafi's system BOTH the received signal from the target as well as the output beam go through the deformable mirror, because a distortion-corrected received signal beam reading as well as a compensation of atmospheric distortion for the transmit signal beam are BOTH desired. If a distortion-corrected received signal is not desired, as in Applicant's case, that provision may be simply discarded, as described in the previous Office Action. However, that is not even necessary, because such an arrangement is not claimed by Applicant, although it is included as an embodiment in the disclosure. This unclaimed limitation has been also brought up in a previous section of this Office Action.

► In response to applicant's argument on page 12, that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

In the instant case, the rationale to replace Wang's Brillouin mirrors by Anafi's (WFS + deformable mirror) system is well known in the art and can be easily

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demonstrated by a large number of prior arts, as evidenced by the present prior art of Arimoto et al., in which a (WFS + deformable mirror) system is also used. The unclaimed limitation that Applicant's deformable mirror works only on the output beam, is an obvious version of Anafi's as well as Arimoto's, which cannot be considered as a hindsight to Applicant's invention, since Applicant's invention is less capable and less complicated than either Anafi's or Arimoto's (e.g., no imaging and no distortion-free receiving capability). It would be highly ridiculous to claim that the act of discarding something unnecessary from a more capable and more sophisticated arrangement, as those of the prior arts, to derive a less capable arrangement, as Applicant's, as being an act of hindsight that includes knowledge gleaned only from the applicant's disclosure. If anything can be judged as hindsight, it is certainly much more plausible to consider a less capable system, as Applicant's, as being a hindsight based on a knowledge that is gleaned from Anafi's or Arimoto's disclosure.

► Applicant's argument on page 12, that the Examiner's rationale to replace Wang's Brillouin mirrors by Anafi's (WFS + deformable mirror) system, i.e., that "*Anafi's is a modern version that is much more versatile than the passive system of Wang's*", is a specific and legitimate motivation for modifying Wang's by Anafi's in a § 103 rejection. As such, it should never be taken as a statement of universal validity, or even as a general rule, as Applicant is trying to do with his arguments. The correctness of the statement is further supported by the fact that Wang's invention was dated 02/1977, which is 14 years older than Anafi's, dated 02/1991. Therefore, the motivation for modifying Wang's by Anafi's as stated in the previous Office action is proper.

In this regard, Applicant's further statement on page 12, that "*active systems are modern while passive systems are not*" is Applicant's own statement that is completely unacceptable, for being based on wrong premises.

► Applicant's argument on page 13, that the Examiner provides *no reason why Wang should be modified by Anafi's*, is simply not true, because the reason has been clearly stated, and was even argued by Applicant, as recited just previously.

Even if the motivation as given by the Examiner in any of the §103 rejection(s) is/are not the same as Applicant's, the motivation for (the prior art) to do what the Applicants have done does not have to be the same as the Applicants' to reach a conclusion of obviousness. "Obviousness is not determined on the basis of the purpose alone." *In re Graf*, 343 F.2d 774, 777, 145 USPQ 197, 199 (CCPA 1965). "It is sufficient if the prior art clearly suggests doing what Applicants have done, although the underlying explanation of exactly why this should be done, other than to obtain the expected superior beneficial results, is not taught or suggested in the cited references." *In re Gershon*, 372 F.2d 535, 539, 152 USPQ 602, 605 (CCPA 1967). See also *In re Heck*, 699 F.2d 1331, 1333, 216 USPQ 1038, 1040 (Fed. Cir. 1983). In summary, as long as there is some suggestion/motivation within the prior art to make the modification or combination it does not have to be the same as the Applicants'.

► Applicant's further argument on page 13, that it is not clear for Applicant that Wang can be modified by Anafi's (WFS+deformable mirror) system, it is to be emphasized that **both** the technical feasibility and the motivation for such a modification are obvious to one of ordinary skill in the art.

► Applicant's other argument on page 13, that the modification of Wang's by Anafi's would "*destroy the intent, purpose or function of the invention disclosed by Wang*", it should be strongly emphasized that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. If the prior art apparatus, i.e., Wang's as modified by Anafi's, is able to perform the process as claimed, then it meets the claim. *Ex parte Masham*, 2 USPQ2d 1647 (1987).

► Applicant's arguments on pages 13-16 regarding new limitations introduced by the Amendment are not persuasive, as recited in the new rejection of the amended claims.

Specifically addressing the new limitations argued on pages 13,14, 17 and 18, after a signal is received by a receiver, it is well known in the art, how to extract any desired information, as long as this is contained in the received signal. Again, regarding the unspecified "**information**" recited in the amended claims, Applicant is reminded of the previously cited remark reproduced from the first Office Action, that it is not possible to reject such a general terminology "**information**" without any further specification of what is meant by "**information**". *A specific prior art will be given only after more specific features have been incorporated by Applicant into the claims, i.e., after the claims have been narrowed down.*

### **Communication**

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16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Bernard E Souw whose telephone number is 703 305 0149. The examiner can normally be reached on Monday thru Friday, 9:00 am to 5:00 pm..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John R Lee can be reached on 703 308 4116. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9306 for regular communications and 703 872 9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 308 0956.

bes  
March 19, 2004

  
JOHN R. LEE  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2880